

The Manufacture of Fluoride Chemicals

- All of the fluoride chemicals used in the United States for water fluoridation, sodium fluoride, sodium fluorosilicate, and hydrofluosilicic acid, are co-products of the phosphate fertilizer industry.
- Apatite rock, a calcium mineral found in central Florida, is ground up and treated with sulfuric acid, producing phosphoric acid and two byproducts: calcium sulfate, and two gases, hydrofluoric acid and silicon tetrafluoride.
- These gases are captured in recovery units and condensed into a solution called hydrofluosilicic acid. Sodium fluoride and sodium fluorosilicate are made from the acid.
- The question of toxicity, purity, and the risk to humans from the addition of fluoride chemicals sometimes arises. Almost all of the over 40 water treatment chemicals that may be used at a water plant, such as chlorine gas and the fluoride compounds, are toxic to humans in their concentrated form.
- Added to the drinking water in very small amounts, the fluoride chemicals break apart virtually 100 percent into their various components (ions) and are very stable, safe and non-toxic.
- It takes approximately 4.4 gallons of hydrofluosilicic acid to add 1 part per million (ppm) of fluoride to 1 million gallons of water. During the month of March 2005, the Burlington water plant produced on average 4.3 million gallons a day of finished water. To that 4.3 million gallons a day was added an average of 18 gallons of hydrofluosilicic acid to bring the average fluoride level to 1.1 ppm.
- It is sometimes alleged that the fluoride from natural sources, like calcium fluoride, is better than fluorides added “artificially”, such as from the fluoride chemicals presently used. There is no difference.
- Concern has been raised about impurities in the fluoride chemicals. More than 40 states, including Vermont, have laws or regulations requiring product compliance with the National Sanitation Foundation/American National Standards Institute “Standard 60”. This standard provides for product quality and safety assurance, aiming to prevent the addition of harmful levels of contaminants from water treatment chemicals.

May 2005